The epidemic of “sudden death,” primarily due to a dysrhythmic event that is triggered by ischemia of the myocardium, is the predominant mechanism of cardiac arrest in industrialized countries. The emphasis on early defibrillation and therefore on public access defibrillation is a response to this epidemic. However, the emphasis on sudden death should not dominate discussion to the extent that other mechanisms of cardiac arrest are minimized. Stated simply, one size does not fit all. In an attempt to simplify interventions by bystanders, we have had to de-emphasize “diagnosis.”

Especially in younger victims of cardiac arrest, including crib death and drowning, and in individuals of all ages who have airway obstruction after aspiration of particulates, after traumatic injuries, and as a neurological complication of strokes or drug overdoses, the primary cause is asphyxia. It is in this setting that the “golden seconds” would best be preserved for restoring gas exchange. However, literally minutes are currently wasted after application of automated defibrillators (AEDs) because they are used for repetitive rhythm analysis and capacitor charging.5

These adverse effects of AEDs prompted at least 2 modifications. The first idea, which is a concept for guiding the further development of the technology, is to define 2 discrete types of cardiac arrest. The non-professional rescuer would best be prompted to priorities of intervention contingent on this differentiation. We have suggested the terms dysrhythmic or primary cardiac arrest to contrast with asphyxial, respiratory, or secondary cardiac arrest for this purpose.6

The second modification is further development of the capability of AEDs. The intelligence of the devices should be expanded to help make the distinction between dysrhythmic and asphyxial cardiac arrest and to prompt the rescuer accordingly. Such AEDs would increasingly become “resuscitation boxes,” in which prompting is expanded beyond semi-automated electrical defibrillation based only on rhythm detection. The capability to detect airway obstruction and/or failure of ventilation is achievable. For instance, the addition of presently available noninvasive sensors would potentially detect the mechanical heartbeat and the pattern of breathing. In one instance, this may be accomplished with the same electrodes currently used by AEDs and in conjunction with electrical impedance methods.7 Alternatively, noninvasive sensors, such as carbon dioxide detectors near the airway, are likely to be useful.8 Because outcomes are dependent on prompt bystander intervention,9 the opportunities for improvements are great. In view of the immensity of the problem, which is estimated to affect more than 400 000 victims of out-of-hospital cardiac arrest annually, of whom less than 5% survive,10 we are very pleased that the Post-resuscitative and initial Utility in Life Saving Efforts (PULSE) initiative11 has prompted increasing awareness of the benefits of the very research that would bring such improvements in methods and devices for CPR.

References
